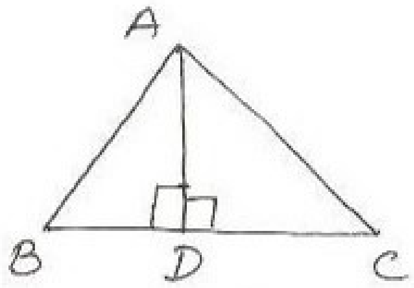
ex 6.5

(16)



given - In $\triangle ABC$
$AB = BC = CA$,
$AD \perp BC$

to prove $3AB^2 = 4AD^2$

proof - In $\triangle ABC$, $AD \perp BC$

$\therefore BD = CD$ --- (i) [In an equilateral triangle altitude is also median]

In rt $\triangle ADB$

$AB^2 = AD^2 + BD^2$ [Pythagoras Theorem]

$= AD^2 + \left(\frac{BC}{2}\right)^2$ [Using (i)]

$AB^2 = AD^2 + \frac{BC^2}{4}$

$AB^2 = AD^2 + \frac{AB^2}{4}$ [Since AB = BC]

(×4) $4AB^2 = 4AD^2 + AB^2$

$\Rightarrow 3AB^2 = 4AD^2$

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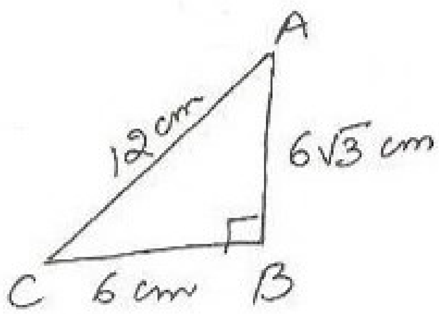
(17)



$AC^2 = 12^2$
$= 144$

$AB^2 + BC^2 = (6\sqrt{3})^2 + 6^2$
$= 108 + 36$
$= 144$

$\because AC^2 = AB^2 + BC^2$

$\angle B = 90°$ (C) [Converse of Pythagoras Theorem]